Results: In axis beams are well within agreement (deviation<4%) for 2 and 1 mm grid sizes. For the 4 mm grid size, at shallow depths (<< dose maximum) larger differences are observed and for narrow field sizes (widths ≤ 10 mm) those differences occur at all depths. Oblique incidence (60°) of the same beams results in an identical deviation pattern. On top of these deviations a non monotonous decay after the build-up zone is observed for the 4mm grid size for all narrow beams ≤ 14 mm. A similar behavior is also observed for off-axis fields; 1 mm and 2 mm grid sizes are equivalent for all the field sizes except at 5 mm depth but 4 mm grid sizes induces errors in output and irregular depth dose curves for field sizes 14 mm or smaller. Several Pinnacle models are evaluated for different Elekta accelerators and output factors are verified using data measured with small cylindrical and liquid ion chambers. The 8 mm field size is not included while chamber volume effects underestimate the maximal dose values. The average agreement for the 4 mm grid size between calculation values and the measured data for both detectors (SSD=90 cm depth 10 cm) for off-axis field settings is underestimation of 2.49%±3.10% while an overestimation 0.13%±1.39% is obtained using a 2 mm grid size. Those findings are confirmed by the less accurate agreement for the 4 mm calculation grid size on treatment plans for IMRT treatment verified on a Delta4 phantom for breast treatment.

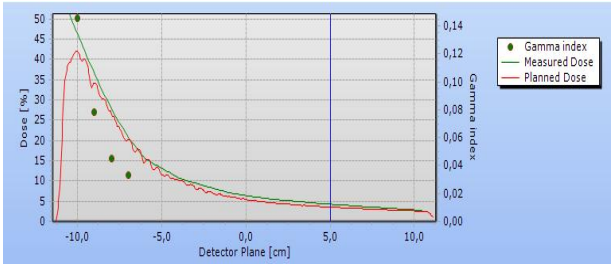

Figure : Clinical IMRT beam on Delta-4

Conclusions: The influence of the grid size on the dose prediction in the treatment planning system is confirmed. Commissioning tests revealed inaccuracy for the 4 mm grid sizes for small oblique and off axis segments. This inaccuracy was confirmed on Delta-4 pre-treatment evaluations.

EP-1423

Comparison of AAA and collapsed cone algorithms for planning of breast treatment with SIB technique

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Purpose/Objective: To evaluate simultaneous integrated boost (SIB) breast cancer plans calculated with the anisotropic analytical algorithm (AAA) using the collapsed cone convolution/superposition algorithm (CCCS) of an independent dose calculation software.

Materials and Methods: Ten cases of SIB breast cancer previously treated in our department were randomly selected. SIB plans were planed using the Eclipse TPS (Varian Medical Systems, Palo Alto, CA). The dose prescription was 50.4 Gy for the breast (PTV50.4) and 64.4 Gy for the tumor bed (PTV64.4), delivered simultaneously in 28 fractions. Organs at risk (OARs) included the lungs, contralateral breast and heart. PTV50.4 was planned using filed-in-field tangential beams, while the PTV64.4 was treated in the same plan using 3-5 sliding window IMRT fields. Patient's dose distributions were calculated with AAA algorithm. Photon beams of 6 MV from a Varian Clinac 2100 CD equipped with the Varian Millennium 120 MLC were used. All Eclipse plans (a total of 20) were sent to the Mobius3D software (M3D, Mobius Medical Systems, LP, Houston, TX) to be recomputed using CCCS algorithm, by keeping the same monitor units. The CCCS algorithm was factory-configured with independent basic input data for our linac model. Only the linac output and the MLC dynamic leaf gap were adjusted in the M3D system in order to match our linac. The plans computed by the Eclipse and the M3D software were compared using the 3D gamma tool. The global gamma criteria of 3%/3 mm was used. Passing gamma rate was the metric used for the PTV and OARs for comparison aim. The '95% PTV coverage' (minimum dose received by the 95% of the PTV) was also compared.

Results:

1) 3D Gamma of the PTVs: passing rates were always ≥ 99%.
2) 3D Gamma of the OARs: passing rates ≥ 99.0% were observed for all OARs.
3) 95% PTV coverage: differences ≤ ±1.5% were found in PTV50.4 and PTV64.4.

Conclusions: Excellent dosimetric agreement between the Eclipse/AAA and the M3D system was found. The M3D system offers a way to cross-check our AAA-based breast SIB plans using an independent and advanced algorithm as CCCS.

EP-1424

Comparison of AAA and collapsed cone algorithms for planning of cranial intensity modulated radiosurgery

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Purpose/Objective: To compare analytic anisotropic algorithm (AAA) and collapsed cone convolution/ superposition (CCCS) dose calculation algorithms for cranial intensity modulated radiosurgery (IMRS) treatments.

Materials and Methods: Cranial radiosurgery is planned at the Quirón Hospital Radiotherapy Department using sliding-window IMRT modality (IMRS). The IMRS plans are calculated using the AAA algorithm of the Eclipse TPS (version 10.0, Varian Medical Systems, Palo Alto, CA). 6MV beams from a Varian Clinac 2100 C/D equipped with the Millennium 120 MLC were used. Accuracy of AAA for IMRS treatments was previously reported by our group (Med Dosim. 2014 Summer; 39(2):129-33). The Mobius3D system (M3D, Mobius Medical Systems, LP, Houston, TX) is a dose calculation software based on the CCCS algorithm. The CCCS algorithm was factory-configured with independent basic input data for our linac model, but taking into account the actual output of our linac. In this work, the factory value of the MLC dynamic leaf gap (DLG) was tuned to get absolute dose differences